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IN presenting a few cases of appendicitis, which it has been my fortune to have recently seen, it is not my purpose to consider in detail this most important pathologic condition. Nor can I hope to place before this Society any facts which may be new. My object is rather to add my observations to existing data. For out of the accumulated experience of all must develop the true pathology and treatment of appendicular disease.

With the presentation, in 1886, of the result of his investigations into the pathology of the appendix, to the Association of American Physicians, Fitz established a new era in our knowledge of these conditions. Since Morton, in the spring of 1887, deliberately cut down upon and successfully removed an ulcerated appendix, and the equally successful undertaking of Sands at the close of the same year, the surgical treatment of the diseased appendix has been completely changed.

The subdivision of appendicitis into many forms

[1] Read at the meeting of the New York State Medical Association, November 15, 1892.

only serves to obscure a proper conception of the condition, and render more difficult a decision as to the proper treatment. In a large majority of cases inflammation of the vermiform process is of the catarrhal type, terminating without suppuration. It is not easy to determine with mathematic accuracy what percentage of cases belongs to this class. It has been variously stated that it would include 80, or possibly 95 per cent. This large group would embrace those to be treated by medicinal measures. No one would recommend operative interference for them.

The very fact that such a large number of cases is quite certain to recover in the hands of the physician makes it all the more necessary that he be on his guard not to include among them a single case that might ultimately demand surgical treatment. To determine what cases are to be treated medicinally and those that should be treated surgically will often tax the ingenuity and skill of the physician. I shall deal in this paper only with such cases as may be suitable for surgical measures. To this class belong, first of all, cases in which the inflammation reaches the suppurative stage. As types of the suppurating form, not involving the peritoneal cavity, I desire to refer briefly to two cases:

Case I.—On the 29th of January, 1892, I was requested by Dr. Breese, of Syracuse, to see with him a man, forty-one years of age, a machinist, with a negative family history, who, twenty-five years previously, had had typhoid fever, and five years later smallpox. He stated that he had had numerous bilious attacks. Preceding these,

there would always be pain in the right iliac fossa. This pain would be severe enough to make walking difficult. It would increase in intensity until it prostrated him. Nausea and fermentation of food in the stomach would occur, and he would ultimately be relieved by free emesis and evacuation of the bowels. As long as twenty years previously he recalled having had a tumor form in the right iliac region, which ultimately disappeared. On the 1st of January, 1892, his pain reappeared, but he kept about until the 16th of the month, each day finding walking more difficult, and the pain more severe. A tumor, steadily increasing in size, appeared in the right iliac fossa during the two weeks preceding my visit to him. There was constant fever. The bowels moved once daily. There was anorexia and nausea, but no vomiting. I found very extensive tumefaction, reaching well down to Poupart's ligament, upward as high as the level of the umbilicus, and internally for a distance of three inches. Rectal examination revealed the presence of a tumor. His hygienic surroundings were very poor, and the prospect of care at home no better. He was, therefore, sent to St. Joseph's Hospital on the following day. Upon his arrival we found that during the preceding night there had been a spontaneous rupture of the abscess into the rectum, and all evidence of tumor had disappeared. Pus was discharged for a period of five days, after which the patient's local and general condition constantly improved, and he left the hospital on the 18th of February, thoroughly well.

The statement is usually made that recurrent forms of appendicitis rarely lead to suppuration. This is, I believe, by no means the rule. In this case, I take it, we are obliged to regard his so-called

"bilious attacks" as manifestations of recurrent appendicular inflammation. It has been recently said that rectal examination is very valuable in determining at an early period the presence of disease of the appendix. For myself, I have only encountered it very late. Lange and others have operated upon this form of abscess, which the Germans prefer to call paratyphlitis, by incision through the rectum, with, as a rule, a successful termination.

CASE II.—H. C. H., thirty-eight years of age, was seen in consultation with Dr. J. L. Heffron, July 14, 1892. During the previous winter the patient had been seriously sick with typhoid fever, from which he seemed to have made a very satisfactory recovery. At various times during the past few years he had attacks of severe pain in the right side of the abdomen, associated with nausea and constipation. Nine days prior to my visit he had been seized with severe pain in the bowels, located well down in the right inguinal region. The bowels had moved daily by administering one dram of Rochelle salts each morning. Tympanites was controlled by intestinal antiseptics. Heat applied did not relieve the pain, and was irksome to him. The temperature had been well down, although at my visit it reached 102°. The pulse had usually been about 80. His pain was not at all severe, nor did he really feel sick. After the fifth day a tumor could be mapped out, reaching along the brim of the pelvis from the anterior superior spinous process downward three or four inches. It was very firm, did not fluctuate, and was not at all tender. Neither the condition of the patient nor the tumor seemed to demand active interference. I did not see the patient again until

November 22d. There had been a daily rise of temperature. The thigh was drawn upward, and rotated inward. The tumor had grown rapidly in size, was very tense—in fact, too tense to permit the recognition of fluctuation. Immediate operation was advised, and under ether the abscess was freely opened by an incision running one inch above and parallel to Poupart's ligament from its outer third up to the anterior superior spinous process. In carrying the incision into the depth, the peritoneum was incised for the distance of an inch, the omentum protruding. This was speedily closed with catgut sutures. It was estimated that nearly a pint of pus was discharged. The wound was thoroughly irrigated and packed with iodoform-gauze. Daily irrigation with a sublimate solution, and packing with iodoform-gauze, were kept up. The closure of the wound has been very slow, and in fact at this late day there still remains an unhealed sinus with a depth of about one and a half inches, and a transverse diameter of one-quarter of an inch. The general health of the patient has steadily improved, but mentally he is greatly depressed because of his tedious convalescence.

This case is another example of suppuration occurring in a chronic relapsing appendicitis. The vermiform process probably had melted away in the course of the suppurating inflammation. The abscess-cavity, with its thickened walls, evidently stood in the way of prompt repair, and subjected the patient to the annoyance of very tardy recovery, and the possibility of a permanent sinus.

Case III.—As very strikingly opposed to the slowly-forming pus-collections which are hemmed in by adhesions, and from which the peritoneum is

thus protected, I desire to report the history of a patient seen with Drs. Elsner and Didama, October 3, 1891. He was unmarried, twenty-three years of age, a candlemaker. He was very vigorous, and since childhood had never required any medical attendance. On the morning of October 22d he had gone to his work as usual, but at 10 o'clock called upon Dr. Elsner, complaining of pain in the abdomen, which upon examination was found to be distended, rigid, painful on pressure, particularly so at the McBurney point, two inches from the anterior superior spinous process, on a line drawn to the umbilicus. It was learned later, that on the preceding day he had been obliged to return home from his work because of abdominal pain, but finding relief from medicine administered at home, he resumed his work. When first seen by Dr. Elsner the temperature was normal; yet the diagnosis of appendicitis was made. Within twenty-four hours the condition was greatly aggravated. There was constipation, increasing pain, some vomiting, general peritonitis; temperature 102.5°, pulse 96. In the afternoon, when seen by myself, together with Dr. Elsner, it was decided to perform celiotomy. The patient was properly prepared with the usual precautions. An incision along the outer border of the right rectus abdominis muscle was made. There was but little bleeding. Upon incising the peritoneum thick yellow pus appeared. The wound was enlarged, and the cecum exposed. Upon its surface were thick adherent flakes of pus; the omentum was not gangrenous, but partly thickened, and some pus was in the iliac fossa. The appendix was reached without difficulty, lying to the outer side of the cecum, adherent to the surrounding tissues, but easily separated. It was thickly infiltrated, darkly discolored, and upon its free extremity presented a

gangrenous ulceration. There was no perforation, nor did it contain any concretion. It was one and three-quarters inches long. After ligation it was cut off, its surface cauterized with concentrated carbolic acid, the diseased surfaces were touched with a strong sublimate solution, a drainage-tube was inserted, around it the packing of iodoform gauze, and the wound partially closed. After the operation the pulse was 130. At 10 P.M., patient was resting quietly. The pulse, however, had gone to 150, the respirations to 30, the temperature to 102.8°. The patient had not urinated voluntarily during the entire day. The following morning the nurse reported that the patient had passed a quiet night. At 10 in the morning the temperature was 102.8°, pulse 130, respirations 30. At 3 P.M. a marked change suddenly came over the patient. The temperature shot up to 105.5°, his pulse to 160; his respirations became shallow; muttering delirium and great depression appeared. When seen by me at 6 P.M. he was unconscious, the pulse flickering, and an hour later the patient was dead.

This very rapid development of ulcerative appendicitis, awakening almost from the outset a septic peritonitis, without any previous manifestations of disease of the vermiform appendix, is very unusual. That a person should have continued his work after a peritoneal inflammation had developed, and not have presented himself to a physician for treatment, hardly seems possible.

The period at which an operation is performed is not to be designated as early because a few hours or even days have elapsed since the patient has presented himself for treatment. This period cannot be measured by any supposed period of time. An

early operation is one performed while the disease involves only the appendix. If peritonitis is present, it matters little whether for its development it has required one hour or one week. The complication is equally serious in either event, and the operation, no matter how soon performed after the appearance of septic peritonitis, is no longer to be regarded as an early operation. Dr. Jacobi has made a very happy exchange of terms by suggesting that operations, to be successful, must be not only early, but timely. Very few cases have recovered in which septic peritonitis has coëxisted. Recently, however, Abbe has reported the successful termination of some of his operations, by making a second incision upon the left side of the abdomen, and in this way establishing thorough irrigation.

Case IV.—February 10, 1892, I was called by Dr. E. A. Didama to Cortland, N. Y., to see a young man, aged twenty-seven. The patient had never been seriously sick, but for several months complained of a "pain under the ribs" on the right side, on exertion. There never had been an acute attack of pain or fever. He had felt usually well until the morning of the 8th, when he was seized with pain so severe, which he referred to the epigastrium, that he was obliged to stop work. There was only slight elevation of temperature, but great pain and constipation. An anodyne was administered. On the following day the pain was intensified, and it was necessary to administer morphine hypodermatically. On this day vomiting set in. On the 10th the symptoms were aggravated, the pain being localized in the right side. He was unable to retain either food or medicine administered by the

mouth, and under the influence of a mercurial cathartic the bowels moved loosely several times. One movement in the afternoon, which contained solid fecal matter, relieved the patient considerably. At 1 in the afternoon the temperature was 102.5°, the pulse 102. When seen by me at 3 o'clock the temperature was 101°, pulse 110, respiration rapid and shallow. Both limbs were extended, and the patient moved about in bed with great pain. The entire iliac region was exceedingly sensitive to the touch, and the abdomen was slightly distended. Along the outer iliac fossa dulness existed for an area one inch in breadth. No tumor could be felt. The most tender point was one and one-half inches from the anterior superior process, on a line to the umbilicus. The patient felt somewhat improved, but the persistence of the local signs led me to advise celiotomy. Assisted by Drs. Didama and Higgins, of Cortland, after a hasty preparation of the patient, I made an incision, four inches in length, along the linea semilunaris. Upon incising the peritoneum, a stream of thin pus appeared. The appendix did not readily come into sight, but was discovered by my finger, external to and behind the cecum, extending upward, and adherent throughout its entire length. It was greatly thickened, infiltrated, darkly discolored, purple at its terminal extremity, and for a distance of one and one-half inches gangrenous near its attachment to the cecum. With some difficulty it was detached, and dissected well out to the cecum. The parts were sponged out with an antiseptic solution, the intestines protected with sponges, the appendix drawn up, ligated with silk at its base, and after tying its mesentery, removed. It was found to be six inches in length, distended with a quantity of thin pus, and contained no less than one dozen firm concretions of fecal character. The cut surface was cauterized with car-

bolic acid, the cavity was thoroughly mopped with a sublimate solution 1 to 1000, a drainage-tube introduced, surrounded with a packing of iodoform-gauze, and the wound partially closed at its upper extremity. He rallied promptly from the operation, and two hours later the temperature was 98.5°, and the pulse 78. He slept fairly well during the night, and a change of dressings was made early the next morning. The patient still remained free from fever, and though suffering at the time of dressing, was otherwise free from pain. Word was received on the 13th of the patient's continued improvement, and the statement made that apparently nothing could interfere with his recovery. Shortly before 10 o'clock on the evening of the 15th, I received a message calling me immediately to Cortland. On that evening the patient had suddenly developed a rise in temperature, and great pain in the iliac fossa recurred. The bowels had moved daily, and there had been substantially no discharge from the wound. Anesthetizing the patient, I made an examination of the wound, and found some adhesions at the surface. Beneath the superficial adhesions there was a small quantity of pus, and on displacing the head of the colon, a stream of liquid feces appeared. Cleansing the wound as well as possible, an examination showed a perforation into the cecum, close to the appendicular attachment. Its edges were promptly denuded, inverted, and the wound closed with a Lembert suture.

The patient rallied nicely from this operation, but gradually sank from the development of a septic peritonitis, and died on the 20th of February.

The very promising course of this case in the early days following the operation had led us all to look forward, with apparently good reason, to a

happy termination; but despite the irrigation of the wound with antiseptic solutions, and the subsequent careful packing of iodoform-gauze by Dr. Didama, the septic inflammation led to the perforation of the cecum.

Case V.—September 24, 1892, I was called by Dr. C. S. Roberts to see J. M., aged twenty-one years, a butcher, unmarried, strong and robust, for the purpose of relieving what was supposed to be strangulated hernia. The patient was said to have had a right indirect inguinal hernia, which, when protruded, would return by lying down and keeping quiet for a short time. On the evening of the 22d he lifted a heavy quarter of beef, and was speedily seized with pain in the abdomen. During the night the pains assumed great severity, and were restricted to the region of the umbilicus. On the morning of the 27th he was given two large doses of salts. His bowels had moved on the previous day, but did not respond to the salines. The pains increased in severity, and Dr. Roberts, being called, administered an opiate, without relief. A soft elastic tumor existed in the upper portion of the right side of the scrotum. Taxis was applied, and also heat, but ineffectually. The patient was put upon his back, with thighs elevated, and resting upon a chair. In this position I found him at 4 P.M. on the 24th of September.

Examination of the tumor revealed an elastic swelling the size of a small hen's egg. The spermatic cord could be felt above and below. The abdomen was not distended, but was exceedingly rigid. The tongue had a dry, brown central streak. The pulse was 80, the temperature 100.5°. Upon pressure the entire abdomen was tender, but the pain was particularly upon the right side, and

tenderness to digital pressure most marked at the McBurney point. The opinion was expressed that whatever the swelling in the scrotum might be, it had nothing to do with the abdominal trouble, which was believed to be the beginning of general peritonitis, dependent upon appendicitis. Celiotomy was advised, and, assisted by Drs. Roberts and H. D. Didama, was undertaken in the usual way. The incision was made along the outer border of the rectus abdominis muscle. After controlling the hemorrhage, which was slight, the peritoneum was opened. No pus was found. The appendix was concealed in a mass of adhesions. From these it was carefully separated, and was found to be one and one-half inches in length, thickened, almost purple in color, its surface in a condition of gangrenous inflammation. Near its base it was constricted and bent upon itself. It was ligated at its base, severed, and its cut end cauterized with carbolic acid. Every part was fully washed, and as there had been no pus present the wound was carefully closed by suture. It was now thought advisable to examine the scrotal swelling. An incision over it soon exposed an encysted hydrocele of the cord. This was split open, stitched to the surrounding skin, and packed with iodoform-gauze.

In the evening the urine, which had been retained for twenty-four hours, was drawn with a catheter. He passed a very restless night, but suffered more from the cystic than the abdominal operation. On the following day the temperature was 101.5°, but the tongue was less dry and the abdomen was less tender. There was no vomiting, and the bowels remained constipated. By the 28th of September all evidences of peritoneal inflammation had disappeared, and from this time the patient made an absolutely uninterrupted recovery.

In this case the timely removal of an appendix, beginning to be gangrenous, arrested peritoneal inflammation, and resulted in a very happy recovery. I believe a delay of twenty-four hours would have placed the patient beyond operative relief.

Case VI.—C. W., aged forty, married, was seen September 9, 1891. He had usually enjoyed good health, but early in May last, while at Baldwinsville, he was seized with pain in the right side of the abdomen, with nausea, fever, and constipation, and was confined to his bed for one week. During the latter part of July a similar attack confined him to his bed for a few days. Two days previously the third recurrence manifested itself. During the months that had intervened there had been more or less constantly present a tender spot on the right side of the abdomen, which frequently interfered with locomotion. An examination showed a very slight tumor. Tenderness to finger-pressure was marked at the McBurney point. There was persistent nausea, but no vomiting. During the following week the patient was kept abed, although the acute manifestations disappeared about the 14th of the month. All that remained was a slight dulness along the outer border of the iliac fossa, and a little induration just above the level of the anterior superior spinous process. The patient, who had become greatly depressed because of the three recurrences of the inflammation of the vermiform appendix in the course of four months, very readily consented to the suggestion that the appendix be removed. On the 20th of September, 1891, he was removed to St. Joseph's Hospital, Syracuse, and on the following day, assisted by some of the gentlemen of the hospital staff, after the usual preparations, I made an incision into the abdominal

cavity, as heretofore described, and after a little difficulty discovered the appendix adherent on all sides to the outer and posterior portion of the cecum. It was an inch and three quarters in length, densely infiltrated, and constricted at its base. Protecting the peritoneal cavity with sponges, it was removed by the knife, and its base cauterized with the Paquelin cautery. The abdominal wound was closed. There was nothing to mar the patient's recovery, which proceeded in every way satisfactorily. In the fourteen months which have elapsed since the operation, the patient has not had the slightest suggestion of a return of the previous symptoms, and has improved so much in his general condition that, to use his own words, "he feels quite like a new being."

The cases presented form an excellent text for the discussion of the surgical treatment of appendicitis, inasmuch as they present the various surgical aspects of the disease. But as I have already occupied so much time, I prefer to briefly summarize the propositions I have to offer, and put them in the form of a series of conclusions, based not only upon my own cases, but upon the accumulated experience now at the disposal of the profession.

Conclusions.—1. As the appendix, and not the cecum, is the primary seat of disease, these forms of inflammation should be known as appendicitis. The terms typhlitis, perityphlitis, and paratyphlitis are not only confusing, but incorrect.

2. It is most important to determine whether the inflammation is non-suppurative or suppurative. If suppurative, it is equally vital for proper treatment to establish whether the diseased appendix and the

purulent collections are to be hemmed in by protective adhesions, or to remain in direct communication with the general peritoneal cavity.

3. With symptoms of moderate severity, and no tendency of the inflammation to increase in extent or severity, but rather to decrease after thirty-six hours, it is safe to treat the case medicinally.

4. The exhibition of salines or other cathartics, in the early stage of appendicitis, is not only inadvisable, but likely to interfere with the development of protective adhesions, and may even be responsible for perforation. Exploration with the needle to determine the presence of pus is useless, and may be dangerous.

5. The violence of symptoms, and their continuance and progression, indicate the presence of existing suppuration, and render operative interference justifiable. The earliest manifestations of a developing general peritonitis make immediate operation absolutely imperative.

6. Each case is to be considered in the light of the individual symptoms it presents. The absence of fever should not lull the medical attendant into a belief of security. The proper moment for operative intervention in a given case cannot be established by the period of time elapsing in its development. Timely operation implies its performance before the appearance of septic peritonitis or other serious complications.

7. When the inflammatory process is of moderate severity, and evidence of tumor-formation is present, operation can be delayed until the fifth, or even as late as the twelfth day. The incision then to be

made is to begin parallel with Poupart's ligament, an inch above its center, and curves upward along the outer border of the iliac fossa, and is thus to be entirely extra-peritoneal.

8. Acute cases, manifesting signs of perforation or gangrene, with no evidence of protective adhesions, demand immediate operation, the incision to be carried along the outer border of the rectus abdominis muscle, and directly into the free peritoneal cavity.

9. Advanced cases of suppuration, in which the abscess is post-cecal, can be opened by rectal incision.

10. Patients in whom attacks of appendicitis persist in recurring, especially when localized tenderness continues, should submit to the removal of the appendix during an intermission.